CEREBRAL TUMOR.[1]

REPORT OF A CASE OF REMOVAL IN TWO STAGES BY THE OSTEOPLASTIC METHOD; SUBSEQUENT WIRING OF BONE-FLAP; INTRODUCTION OF A GOLD PLATE.

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A WOMAN, Miss A. K., aged thirty years, was admitted to St. Luke's Hospital, August 25, 1904. There had been a gradual failure of vision, the diminution being more rapid on the right side, until, at the date of admission to the hospital, she could barely distinguish light with the right eye, and could only make out shadows from large objects with the left.

Nearly five years before, a hard lump, an osteoma, the size of a walnut, appeared in the right parietal region. During three years it grew to the size of the fist, and it was of this size at the time of removal by Dr. J. S. Reeve, of Appleton, Wis., about eighteen months before admission. She had been troubled more or less with sick headaches since childhood, chiefly frontal and lately occipital, and also in the former period she had rheumatism, scarlet fever, measles, and diphtheria.

In addition to the dimness of vision and headache, Miss K. has noticed failing memory; numbness, with tingling beginning in the fingers of the left hand and creeping up the arm, varying as to time, but usually lasting about half an hour; vertigo and vomiting frequent; tenderness over the scar. Her appetite and sleep were unusually satisfactory; weight, 105 pounds; no gain or loss; constipation; menstruation, which began at fourteen, regular; family history negative.

She went out with difficulty, and fell a number of times in consequence of defective vision and dizziness. During childhood the headaches were very severe. The vomiting sometimes lasted nearly half a day. The attacks occurred almost daily. She suffered in this way until August 24, 1904, although not so severely as in childhood.

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Physical Examination.—(*a*) General. Color healthful; patient cheerful; well nourished; strength and development fair; right-hand grasp somewhat stronger than that of the left; papular eruption on chest, shoulder, and arms; shape and movements of chest normal; hallux varus on both sides.

Head. The skull is abnormally prominent at the site of the operation for the removal of the osteoma; vessels of the scalp largely dilated.

Special Examination.—(*b*) No deviation of tongue; pupils dilated; vision of left eye much impaired.

The following is the report of Dr. Paul Guilford's examination of the eyes:

"Tested together both pupils responded quickly and equally to light, but when left uncovered the right pupil dilated and did not respond to light. Vision of right eye was reduced to simple light perception; vision of left eye 20/50; not improved by glasses; media clear; marked choked disk of both eyes, especially of the right, where nerve had swollen eight diopters; left nerve swollen five diopters; no retinal hæmorrhage. Optic atrophy will surely follow; prognosis very bad." He did not think vision would be improved by removal of a tumor.

Touch and sensation were apparently normal; reflexes responded readily on the right side; knee, biceps and triceps reflexes exaggerated on left side; no Babinski; no ankle clonus.

The following diagnosis was arrived at: Intracranial tumor, probably an osteoma, growing from the inner surface of the skull beneath the site of that above referred to. Dr. Archibald Church saw the case in consultation, and concurred in the diagnosis of brain tumor in the location of the osteoma removed by Dr. Reeve. The operation was set for August 30, 1904.

Technique.—After a final table preparation of the head, the upper and lower extremities of the Rolandic fissure and the middle meningeal artery were located. A large horseshoe-shaped flap was outlined by incision in the parietal region on the right side, the base or pedicle looking downward, the flap being made narrower at the base for convenience of subsequent operative steps; scalp separated from the bone, leaving about one inch of bone surface exposed previous to making four small trephine openings in the skull, one on either side at the pedicle and one on either side of the upper portion of the flap, with a view of dividing the

intervening bone. The hæmorrhage from the scalp was profuse and difficult to manage. In spite of the fact that the head was encircled with an elastic band, hæmorrhage persisted even after a number of artery forceps had been employed. These, as well as digital compression here and there, were not sufficient to completely arrest the bleeding. In other words, the moment the pressure was relaxed the hæmorrhage was renewed.

The trephining was completed, and the intervening bone, between the two upper trephined holes, divided with considerable difficulty, as the bone was half an inch thick and devoid of diploic structure, so that the division of the skull by rongeur forceps was very tedious. At this stage the patient's condition became so alarming, chiefly from loss of blood, that it was thought best to abandon the operation for the time being. The wound was quickly closed by continuous suture. The prostration was extreme, and great difficulty was experienced in carrying the patient through the next twenty-four hours. She had, however, so far improved that the second stage of the operation was performed on September 6.

Technique.—A thorough table preparation; rubber constrictors placed around the head; scalp readily pulled apart at the line of incision. Bleeding immediately became very severe, but was quickly arrested by loosening the scalp at the pedicle for the purpose of enclosing the latter in an elastic ligature. The division of the bone-flap, by means of rongeur forceps, became very tedious and discouraging until, by means of a burr-head drill, the skull was thinned sufficiently to allow the biting forceps to proceed more rapidly.

The bone-flap at the pedicle was partially divided by means of the Gigli saw having been passed beneath, and the underlying parts protected by means of F. C. Schaefer's Protector. Moderate force completed the division by fracture, when the osteoplastic flap was readily turned down exposing the dura. There was an opening in the dura at the upper right-hand segment of the exposed portion, filled with a soft tumor-like substance. This opening was enlarged sufficiently to introduce two fingers, by means of which soft, light purple material was removed from a surrounding capsule. The tumor-like substance was of the consistency of shad roe. Several sutures were placed in the dura and the tumor cavity packed with iodoform gauze. No effort was

made to remove the capsule. The osteoplastic flap was replaced, iodoform gauze drains brought out at dependent portions of the incision, the scalp wound sutured, constrictor removed, and large dry-dressing applied. Patient was in fairly good condition upon her return to the ward, but two hours subsequently the pulse became very feeble, almost imperceptible, and her condition in general required close attention. The next day, however, there was marked improvement.

At the first dressing on the 8th there was a slight amount of purulent discharge at the lowest drain opening. September 20 all the stitches were removed. There were four points in the scalp from which there was a discharge, viz., at both lower segments of the flap, a point where the tumor was situated, and the middle of the posterior leg of the incision.

It was observed at the dressings that the osteoplastic flap was elevated one and one-half centimetres above its normal level. It was, however, easily pressed into position without resulting cerebral symptoms. A hernia cerebri had developed, but it was easily reduced, and it was thought that it could be made to disappear by means of compresses of iodoform gauze and other dressings kept in position by a strip of adhesive plaster, and over all a Martin's bandage, the latter being more particularly directed to keeping the bone-flap in position. Peroxide was directed to be used through the drainage openings beneath the scalp, followed by irrigation with normal salt solution.

We found that the elastic bandage was not borne well,—not that it produced brain symptoms, but the pressure around the jaws was distressing, and it became necessary to discontinue it.

September 26 the discharge had diminished. As there was no tendency towards bone union in the skull, and without such pressure, as the patient was unable to endure, it was impossible to prevent the reappearance of the hernia cerebri and the further elevation of the bone.

September 26 the following final operation was performed: Drilling the skull; insertion of a 22-carat thin gold plate beneath the edges of the bone and over the cerebral protrusion; silver wire introduced; flap pressed into as close apposition as possible and wire twisted; edges of scalp wound freshened with scissors; scalp sutured; dry-dressing with gauze drain.

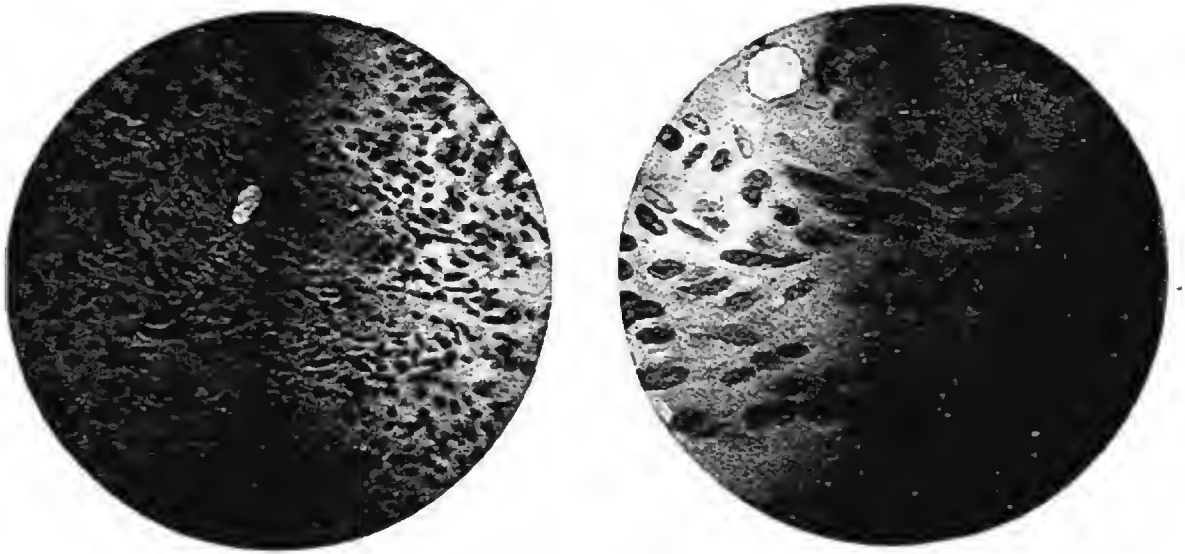

FIG. 1. under low power, shows very well the general structure of the tumor; while FIG 2. under high magnification, shows the spindle formation of the tumor cells where they are cut longitudinally. (Dagg.)

October 1 there was some transient numbness in the left hand.

October 4, interne in charge, while using peroxide along the scalp, accidentally forced some beneath the skull. Immediately the patient complained of numbness in the entire left side of tongue, with severe pain in the head. The numbness disappeared in a few hours, but the headache lasted over a day.

The tumor proved to be a round-cell, capsulated sarcoma. It spread out over the dura for a short distance, some sharp fibres from the skull running into it. The skull was hypertrophied and the diploic space obliterated. The operation was negative, as was predicted, so far as vision was concerned.

Patient stated that objects were recognized with the left eye as she formerly saw them on a very dark night, but that she could not distinguish night from day.

"The histological structure of the tumor is that of a small spindle-cell sarcoma (Figs. 1 and 2), with a considerable amount of intercellular substance. The tumor cells seem to be arranged more or less into bundles interwoven in different directions, thereby giving a variety of form to the nucleus, depending upon whether the bundles were cut transversely, obliquely, or longitudinally. There are no giant cells to be found. Fine trabeculæ of connective tissue, which is very vascular, extend into the tumor from the periphery, and the vessel walls in this connective tissue are very well formed. But those in the tumor proper have very thin walls or none at all, in some cases showing an endothelial lining with the sarcoma cells in close contact; in others only a blood-space in which not even the endothelial coat can be made out." (Dagg.)

September 23. Pathological report of a fragment of the cerebral protrusion: "Fibrinous exudate unorganized; leucocytic infiltration; infection,—diplococci."

For the first operation, August 30, chloroform was employed, and later ether was substituted; for the second, chloroform; morphine, one-quarter of a grain, given hypodermically just before the administration of the anæsthetic.

The patient left the hospital on November 4. Nausea, vomiting, headache, and dizziness had disappeared.

On December 6, 1904, Dr. Reeve wrote me as follows:

"I am glad to tell you that the patient seems to be doing

well. Silver wire was removed without diffieulty two weeks ago. There is a small bit of bare bone visible at present. This is disappearing, and the wound requires dressing only every four or five days. Vision not changed; arm and leg are no worse; condition exeellent;- no temperature or œdema; appetite good; patient looks well; no portion of the gold plate is visible."

I have received two letters from the patient, the last one written December 10, 1904. She stated that the head did not pain, but sometimes there was a momentary throbbing. She further informed me that her appetite was good and she slept very well. The arm and leg had not troubled her since the headaches and vomiting ceased. There was no change in the vision, but artifieial light was somewhat annoying.